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EXAMINER

COSTALES, SHRUTI S

ART UNIT PAPER NUMBER

1714

DATE MAILED: 08/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/511,003

Applicant(s)

JACKSON ET AL.

Examiner

Shruti S. Costales

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/10/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on January 10, 2005 was filed in compliance with the provisions of 37 CFR § 1.97. Accordingly, the IDS filed by the applicant has been considered by the Examiner. It is to be noted that the provisional application (60/368,354) cited on the IDS has not been considered by the Examiner as it is not a published U.S. document. See M.P.E.P. § 609.

Claim Objections

2. Claim 12 is objected to because an improper space appears between "device" and ",", at line 2 of said claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

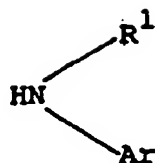
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1 and 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 94/22988 to Mobil Oil Corporation (cited on PTO-1449 filed on January 10, 2005) in view of Kanakkanatt (U.S. Patent Number 6,165,234) and Moreton et al. (U.S. Pre-Grant Publication Number 2004/0186027).

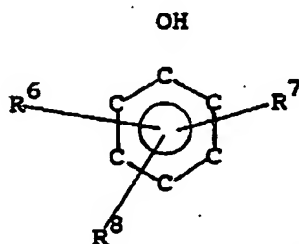
Mobil discloses an antioxidant capable of improving performance of a lubricant to which it is exposed during operation of an internal combustion engine (Page 5, lines 16-19), therein intrinsically including a method for operating the internal combustion engine during operation of the engine and introducing the antioxidant. It is also disclosed that engine wear is inhibited and viscosity control of a lubricating oil is facilitated by incorporating an antioxidant with a fuel (Page 7, lines 6-12). Mobil's antioxidants include an aromatic amine and/or phenol (Page 5, lines 24-25). The aromatic amine includes amines represented by the following formula:

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wherein Ar is an aromatic hydrocarbon group and R¹ is an aralkyl, aryl, or alkaryl having from 1 to 30 carbon atoms (Page 7, lines 31-35; Page 8, lines 1-35; Page 9, lines 1-30; and Page 10, lines 1-22).

The phenol is represented by the following formula:



wherein the phenol is a hindered phenol in which the hydrocarbon groups attached to the phenol, R⁶, R⁷, and R⁸ are spatially arranged about the OH group of the phenol to prevent or retard reaction with other molecules (Page 10, lines 23-35; Page 11, lines 1-35; Page 12, lines 1-35; and Page 13, lines 1-10). The antioxidant is added in effective amounts of at least 14.3 – 57.1 g/1000 l of fuel or 0.0002 to 0.1524 wt% (Page 6, lines 3-9 and Page 7, lines 6-30), corresponding to 2 to 1524 ppm of antioxidant in the fuel.

Mobil also discloses that the performance of a lubricant used in an engine supplied with a gasoline containing different dosages of antioxidant was evaluated (Page 16, lines 2-5), therein intrinsically implying the direct mixing of the antioxidant with

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the fuel component, i.e., gasoline. The lubricating oil containing the antioxidants can also contain other additives generally employed in lubricating compositions such as corrosion inhibitors, detergents, extreme pressure agents, viscosity index improvers, friction reducers, antiwear agents and the like (Page 15, lines 30-34).

The difference between Mobil and the presently claimed invention is the requirement that the antioxidant includes (a) an alkylene or alkylidene coupled sterically hindered phenol oligomer and (b) a reaction product of a hydrocarbyl-substituted hydroxyl-containing aromatic compound, an aldehyde, and a carboxyl-substituted phenol.

With respect to the difference in (a), Kanakkanatt, which is drawn to a flame consumable fuel (Col. 1, lines 50-52), discloses 2,2'-methylene-bis(4-methyl-6-tert-butyl-phenol) at Col. 3, lines 56-57, wherein said phenol is an alkylene coupled sterically hindered phenol. It would have been obvious to one of ordinary skill in the art to use Kanakkanatt's alkylene coupled sterically hindered phenol in Mobil's method because Kanakkanatt's phenol is an aromatic compound having hydroxyl groups that are electron acceptors (Col. 3, lines 50-54), wherein such electron acceptors would work in combination with other antioxidants that are electron donators such as amines (Col. 2, lines 3-5 and Col. 3, lines 28-47 of Kanakkanatt), therein intrinsically providing a more stable antioxidant composition.

With respect to the difference in (b), Moreton, which is drawn to additives for lubricants (Page 1, paragraph [0001]), discloses C₁₈ or greater alkylphenol-formaldehyde resin compounds which contain within the oligomer at least one salicylic

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acid unit (Page 2, paragraph [0015]). It would have been obvious to one of ordinary skill in the art to use Moreton's additive in Mobil's method because the once overbased C₁₈ or greater alkylphenol-formaldehyde resin compounds which contain within the oligomer at least one salicylic acid unit offer an advantage over more traditional sulphur containing overbased detergents because the reduction of sulphur and phosphorus levels due to the possibility of sulphur and phosphorus compounds interfering with the functioning of exhaust emission treatment devices (Page 2, paragraph [0015]), thereby obtaining the invention as set forth in the presently cited claims.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mobil in view of Kanakkanatt and Moreton as applied to claims 1 and 4-10 above, and further in view of Arrowsmith et al. (U.S. Pre-Grant Publication Number 2004/0077506).

The discussion above in paragraph 4 regarding Mobil, Kanakkanatt, and Moreton is herein incorporated by reference.

The difference between Mobil in view of Kanakkanatt and Moreton and the presently claimed invention is the requirement that the antioxidant composition is essentially free of sulfur and phosphorus.

Arrowsmith, which is drawn to lubricating oil compositions (Page 1, paragraph [0001]), discloses no more than 0.06 wt% of phosphorus (i.e., 600 ppm of phosphorus), no more than 0.12 wt% of sulfur (i.e., 1,200 ppm of sulfur), and 1.07 wt% of sulfated ash (i.e., 10,700 ppm of sulfated ash) (Page 1, paragraphs [0007]-[0009] and Page 12, Table 2-continued). It is to be noted that on page 16, at lines 14-15 of the applicant's

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specification, it is disclosed that the phosphorus content should be lower than 0.1 wt% and the sulfur content should be lower than 0.5 wt%, therein implying that the disclosed levels of sulfur and phosphorus meet the requirement of free of sulfur and phosphorus as presently claimed. It would have been obvious to one of ordinary skill in the art to use low levels of phosphorus, sulfur, and sulfated ash as disclosed by Arrowsmith in Mobil in view of Kanakkanatt and Moreton's method because low levels of sulfur reduces Sox-based acids (Page 1, paragraph [0003]) and low levels of phosphorus reduces poisoning of the catalysts used in engine aftertreatment devices (Page 1, paragraph [0005]), thereby obtaining the invention as set forth in the presently cited claim.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mobil in view of Kanakkanatt and Moreton as applied to claims 1 and 4-10 above, and further in view of Emmons (U.S. Patent Number 6,381,947).

The discussion above in paragraph 4 regarding Mobil, Kanakkanatt, and Moreton is herein incorporated by reference.

The difference between Mobil in view of Kanakkanatt and Moreton and the presently claimed invention is the requirement that the antioxidant introduced into the combustion chamber by injection from a dosing system.

Emmons, which is drawn to a method for fuel injection (Col. 1, lines 9-16), discloses a fuel injection mechanism for execution of a pulsed fuel injection includes a dosing valve arranged upstream from a basically typical fuel injection nozzle ending in

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the combustion chamber (Col. 4, lines 39-48). It would have been obvious to one of ordinary skill in the art to use Emmons' dosing valve to inject Mobil's antioxidants into the combustion chamber because it would be possible to directly inject the antioxidants into the combustion chamber (Col. 4, lines 34-38), thereby obtaining the invention as set forth in the presently cited claim.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mobil in view of Kanakkanatt and Moreton as applied to claims 1 and 4-10 above, and further in view of Foster et al. (U.S. Patent Number 6,904,752).

The discussion above in paragraph 4 regarding Mobil, Kanakkanatt, and Moreton is herein incorporated by reference.

The difference between Mobil in view of Kanakkanatt and Moreton and the presently claimed invention is the requirement that the engine is a compression-ignited engine or spark-ignited direct injection engine having an exhaust gas recirculation system.

Foster, which is drawn to internal combustion engines and exhaust aftertreatment systems (Col. 1, lines 19-21), discloses compression ignition engines and a direct-injection spark ignition engine with an exhaust aftertreatment system (Col. 6, lines 40-55). It would have been obvious to one of ordinary skill in the art to use Foster's engines and exhaust aftertreatment system in Mobil in view of Kanakkanatt and Moreton's method because such an exhaust aftertreatment system will enable reduction

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of NO_x and enable desulfation (Col. 13, lines 1-9 and Col. 14, lines 25-35), thereby obtaining the invention as set forth in the presently cited claim.

8. Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobil in view of Kanakkanatt and Moreton as applied to claims 1 and 4-10 above, and further in view of Foster and Arrowsmith.

The discussion above in paragraphs 4-5 and 7 regarding Mobil, Kanakkanatt, Moreton, Arrowsmith, and Foster is herein incorporated by reference.

The difference between Mobil in view of Kanakkanatt and Moreton and the presently claimed invention is the requirement that (a) the engine is a compression-ignited engine or spark-ignited direct injection engine having an exhaust gas recirculation system, and (b) the specified levels of sulfur, phosphorus, and sulfated ash.

With respect to the difference in (a), Foster, which is drawn to internal combustion engines and exhaust aftertreatment systems (Col. 1, lines 19-21), discloses compression ignition engines and a direct-injection spark ignition engine with an exhaust aftertreatment system (Col. 6, lines 40-55). It would have been obvious to one of ordinary skill in the art to use Foster's engines and exhaust aftertreatment system in Mobil in view of Kanakkanatt and Moreton's method because such an exhaust aftertreatment system will enable reduction of NO_x and enable desulfation (Col. 13, lines 1-9 and Col. 14, lines 25-35), thereby obtaining the invention as set forth in the presently cited claims.

With respect to the difference in (b), Arrowsmith, which is drawn to lubricating oil compositions (Page 1, paragraph [0001]), discloses no more than 0.06 wt% of phosphorus (i.e., 600 ppm of phosphorus), no more than 0.12 wt% of sulfur (i.e., 1,200 ppm of sulfur), and 1.07 wt% of sulfated ash (i.e., 10,700 ppm of sulfated ash) (Page 1, paragraphs [0007]-[0009] and Page 12, Table 2-continued). It would have been obvious to one of ordinary skill in the art to use low levels of phosphorus, sulfur, and sulfated ash as disclosed by Arrowsmith in Mobil in view of Kanakkanatt and Moreton's method because low levels of sulfur reduces Sox-based acids (Page 1, paragraph [0003]) and low levels of phosphorus reduces poisoning of the catalysts used in engine aftertreatment devices (Page 1, paragraph [0005]), thereby obtaining the invention as set forth in the presently cited claims.

9. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobil in view of Kanakkanatt and Moreton as applied to claims 1 and 4-10 above, and further in view of Freese, V et al. (U.S. Patent Number 5,604,441).

The discussion above in paragraph 4 regarding Mobil, Kanakkanatt, and Moreton is herein incorporated by reference.

The difference between Mobil in view of Kanakkanatt and Moreton and the presently claimed invention is the requirement that the drain interval is greater than 6,000 miles and greater than 150 operational hours.

Freese, which is drawn to apparatus and methods for detecting the degree of deterioration of lubricating oil (Col. 1, lines 8-10), discloses a safety limit of 30,000 miles

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or 1,500 engine hours as drain intervals (Col. 24, lines 38-56). It would have been obvious to one of ordinary skill in the art to use the safety limits of drain intervals as disclosed by Freese in Mobil's method because the possibility of increased component wear may be reduced (Col. 24, lines 38-56), thereby obtaining the invention as set forth in the presently cited claims.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Although EP 0482253, EP 0569228, WO 9961498, WO 9925677, EP 0856574, and US 3166509 are all cited as "X" references on the International Search Report for PCT/US03/11249, of which the present application is a national stage entry, these "X" references have not been used in the present action to formulate a rejection because such a rejection would be generally cumulative to the ones set forth in paragraphs 4-9.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shruti S. Costales whose telephone number is (571) 272-8389. The examiner can normally be reached on Monday - Friday, 6:30 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone

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number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

SSC
Shruti S. Costales
August 25, 2005

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